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VETERINARY MEDICINE DURING THE PAST FIFTY YEARS

BY

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(*Continued from page* 31)

III. Pioneering Triumphs (continued)

The Evolution of Conceptions regarding Appropriate Measures of Control in Veterinary Preventive Medicine during the past Fifty Years.

(*a*) TOTAL ERADICATION; (*b*) IMMUNISATION, ACTIVE AND PASSIVE; (*c*) PREMUNITION.

The biotherapy and bioprophylaxis as conceived towards the opening of the century to hold such promise that all contagious diseases would soon be brought under control have been doomed to find only limited application in practice. In other words, of the vast array of animal diseases now known to arise from specific infections only a small proportion remain which are amenable to either curative or preventive treatment by means of a "serum" or a "vaccine," at least within the meaning in which these words were currently employed, even among many research workers of the foremost rank, towards the close of the last century and at the beginning of the present century.

Let us here at once make it clear that we do not underrate the very great value of "sera" and "vaccines" in the small proportion of specific infections in which they have been found valuable, and in the particular circumstances in which their employment is called for when again they are of proved value.

We may take, for example, anthrax, the disease for which Pasteur discovered in 1881 his remarkable system of vaccination by subcutaneous inoculation of the attenuated bacilli. There can be no doubt that within extensive territories such as Argentina, South Africa and Australia, where anthrax prevailed seasonally in severe enzootic and even epizootic form, vaccination, along lines similar to those conceived by Pasteur, has been a means of reducing to negligible proportions the losses from what had formerly constituted a prime menace to the livestock industry of those particular territories. Yet, for reasons which need not be elaborated, it would be idle to advance the plea that the system ought to be adopted in current practice in a country like Britain, where cases of anthrax are merely sporadic; and, with a well-organised State department available to ensure accurate diagnosis and prompt disposal of infected carcases, the disease need never occasion more than an infinitesimal loss to the livestock economy.

Again, in a vast territory like India, the specific infectious disease which comes next in importance to the dread rinderpest is bovine haemorrhagic septicaemia—a disease which occurs in severe enzootic form with a short seasonal recurrence, during the few months following the break of the monsoon, from June to September, and afflicts particularly young cattle and also buffaloes, still more severely, and of all ages. It so happens that this bovine disease belongs aetiologically to a group, the pasteurelloses, within which are also comprised fowl cholera and human plague, against which both "sera" and "vaccines," as conceived by the early workers, are remarkably efficacious in actual field practice. The epithet "remarkably" is used here advisedly, because extensive and well-controlled field experience has proved them to exceed the anticipations of the cautious laboratory experimentalist. For vaccination of calves with heat-inactivated cultures before the onset of the enzootic season cuts out completely the serious losses that otherwise prevail among unvaccinated calves in the same areas, while inoculation of healthy buffaloes with a well-prepared anti-serum in suitable dose promptly cuts short a rapidly spreading outbreak within an area in which preventive vaccination has been overlooked. The low grade of immunity, whether "active" or "passive," conferred has thus answered its purpose admirably, and certainly in a sense contrary to what could be achieved using analogous procedures in the case of the more formidable disease, rinderpest.

Hence, as the century advanced, examples accrued of territorial and other peculiarities that must be taken so much into account that veterinary preventive medicine must always be regarded properly as an ecological study demanding an intimate understanding of far more than a single experimental technology.

Fortunately, the province of veterinary preventive medicine has been endowed with a few gifted individuals who have not been slow to perceive the possibilities as well as the limitations of the bioprophylaxis and biotherapy as crudely conceived at the beginning of the century. It will suffice again to give two examples.

The first of these refers to the rapid and remarkable resolution of the problem of lamb dysentery, Dalling's address before the Annual Congress of the N.V.M.A. at Newcastle-upon-Tyne in 1928 representing, in the submission of the writer, having studied almost all the classic papers relating to veterinary preventive medicine, one of the most outstanding for its mastery of combined laboratory and field disciplinary procedure. To an extent that ordinarily does not readily enter into the comprehension of the worker in human preventive medicine, if we leave tetanus out of account, the pathogenic anaerobic bacteria have long been known, from their first differentiation by Pasteur as a class apart, to play a conspicuous part in veterinary pathology, and especially in the ruminant species. As early as 1884, a successful method of preventive inoculation had been devised against the common blackquarter of cattle by the Lyons workers, Arloing, Cornevin and Thomas, and during the following years that method, as such or modified in some ways that were not essentially different, entered into current veterinary practice in all countries. But the techniques available for taxonomic differentiation of the group were not really satisfactory until that study received impetus with the dis-

turbing occurrence of gas-gangrene as a wound complication among troops in the 1914-1918 war. Then, there soon followed the elucidation of diseases other than blackquarter caused by pathogenic anaerobes, such as braxy in sheep by Gaiger in Britain and black disease in sheep by Dodd in Australia; the invaluable work done afterwards by Turner upon the latter disease in tracing the activation of latent spores to migratory flukes in the liver tissue ranks as one of the foremost achievements during the period in elucidating the pathogenesis of an infectious disease. Again, there came the remarkable revelation of the true nature of the serious regional disease of cattle known as *lamziekte* in South Africa. This disease surprisingly turned out to be a botulism afflicting cattle only in those particular regions where the soil, and consequently the herbage, was so much deficient in phosphorus as to cause them to devour decomposing carcases, exposed on the *veldt*, in their craving to satisfy a phosphorus hunger. Where the *veldt* was also rich in botulinus spores the conditions were therefore such as to expose the animals to the rapid onset of the symptoms attributable to the ingestion of toxin. Manifestly, the preventive measures called for in such circumstances did not comprise vaccination but a rectification of the mineral deficiency, or imbalance; and, as is well known, the studies then undertaken formed the starting point of researches in dietary mineral requirements far transcending the resolution of the local South African cattle botulism. Though the gas-gangrene prevalent among troops in the First War had much clinically and pathologically in common with blackquarter in cattle, the causative organisms were different in what then did not seem to be a highly important particularity, namely, that the anaerobe in the former disease possessed the property of elaborating an exotoxin, whereas that of the latter disease did not. Again, although in braxy it was at last established that the pathogenic anaerobe responsible exercised its lethal action within the alimentary tract, so far as could be discerned that action was caused by massive invasion of the alimentary mucosa with the specific anaerobe. It was little suspected at the outset of Dalling's researches that a gas-gangrene type of micro-organism could combine, as it were, the effects of the causative agents of both braxy and botulism. Indeed, so little was this suspected that early work threw suspicion, not on the intestinal anaerobes, but upon a common coliform organism. What transpired later, with respect not only to lamb dysentery but also to nearly related infections in sheep, has been recorded in the literature so recently that it stands in no need of repetition in the present review. That the most appropriate preventive treatment should consist not of conferring directly a passive immunity on the new-born lamb but of conferring it indirectly by appropriate active immunisation of the ewe during pregnancy was a triumph in veterinary preventive medicine, as characteristically novel as events soon proved it to be practicable and efficacious.

The second example is one which acquires merit because on reflection at this present date it conformed to the genuine Griffith Evans' tradition in its stubborn refusal to accede to clamour for the dramatic and immediately utilitarian. Rather was the policy adopted of patiently surveying a disease problem in the light of the knowledge regarding its causation, then woefully lacking, which, as a first step, must be gained, regardless of all insistence upon obtaining a ready measure of control, and then when it turned out from that knowledge that neither " serum " nor " vaccine " intervention could be justified by a shred of valid evidence, to hold off recourse to it. To hold off, indeed, in such a way as some of the recognised masters of the preceding period, even men like Koch, Theiler, and M'Fadyean, sometimes failed to do, not to mention a host of lesser lights, especially in the field of human preventive medicine. A clean sheet was then presented when surprisingly during the past decade chemotherapy was to transform our outlook upon that problem no less than it did completely in the field of human medicine in the aetiologically corresponding infections represented by pneumococcus pneumonia and puerperal fever. We would refer, of course, to the work carried out by Minett and his staff in charting the microflora of bovine mastitis from the moment when on his appointment in 1927 to the charge of the Research Institute on Animal Pathology at Camden Town, London, he decided to concentrate almost the entire relatively meagre resources of that institute towards obtaining exact knowledge upon a single problem, namely, one which in itself had become since the beginning of the century of such increasing concern to the dairy industry as to represent a major limitation to its economy. To an extent which hardly seemed credible at the beginning of the century, " cure," after all, has turned out to be, either alone or in combination with other necessary measures, the appropriate mode of control in so many infectious diseases as to be now almost out of number; but " cure " had to be sought along lines wholly different from those conceived before the advent of the Pasteurian epoch.

Other examples of successful application of sero- and vaccino-prophylaxis and therapy, such as the long-standing one of swine erysipelas and the recent one of canine leptospirosis, are passed by so as to dwell in the remaining space available on the phenomenon which now emerges clearly as the alternative to be adopted in most infectious diseases to total eradication. The control of the virus diseases likewise calls for special consideration.

Premunition as the Alternative to Total Eradication

If we pause awhile to reflect upon this alternative which now presents itself at the close of the last half-century as the current solution to the greater mass of infectious disease, either as the sole solution or co-ordinated with an unceasing search for supplementary chemotherapy, then we can appreciate all the more readily how it came about that the " Golden Age " believed to have been reached during the last two or three decades of the last century hindered as well as promoted advance through a misconception of disease as a natural phenomenon that is in the main essentially ecological. Let it be understood at once that premunition may call for far greater resource on the part of the veterinarian when it is to be applied to animals kept in an advanced state of domestication than ever did the more crudely conceived measures of immunisation denoting the inoculation of " sera " and " vaccines " as advocated at the beginning of the century.

The third instalment in this series of articles was devoted entirely to a single and simple illustration of the operation of the alternative under consideration. Even simpler than the illustration drawn from a study of the evolution in conceptions during the period under review regarding rational control of infection caused by the piroplasmoses is that furnished by prolonged study of the host-parasite relationship in the coccidioses. Both classes, as is well known, are caused by parasites that fall systematically within the sporozoan class of the Protozoa, and the various species of the genera within this class are all

characterised by strict single-host specificity, so that their parasitism is not complicated by multiplicity of hosts. But whereas in the piroplasmoses, transmission from host to host becomes a little complicated by the parasite undergoing a phase of its life-history within a vector, which is a degenerate arthropod, the tick, no such vector complicates the life-history of the coccidia, a short essential intermediary phase being passed in the free outside world. Concluding his most valuable studies upon fowl coccidiosis recently (*Vet. Rec.*, 1947, **59**, 646), Horton-Smith declared clearly the position that has now been reached, in remarks that are well worth quoting, even in a review of this kind which must conform to the present exigencies of space:—

"A study of the epidemiology of caecal coccidiosis shows very clearly how undesirable it is to try to maintain chicks free of infection: the aim should rather be one of controlling the intake of oocysts so that birds are constantly picking up small doses of them throughout life. Coccidiosis of chickens provides an excellent example of the group of diseases caused by parasites of ubiquitous distribution. In this group of diseases it is preferable to maintain the resistance of the host group by permitting an ever-present low-grade infection than to endeavour to prevent infection and thereby retain the susceptibility of the host group."

In the concluding sections (pp. 761-771) of his great monograph on the bovine piroplasmoses [Sergent, Ed., Donatien, Parrot, L., and Lestoquard, F. (1945.) *Piroplasmoses bovines*, Institut Pasteur d'Algérie.] Sergent, who, with his late brother, deserve from their life-long study of the problem the appellation "arch-priests of premunition," had already focused clearly their views on the phenomenon, as later so well expressed in a few words by Horton-Smith, drawing from their own experience its general relegation to a large class of infectious diseases, which they designate as "*maladies infectieuses à prémunition*," namely, those diseases in which an immunity lasts only while there persists a latent infection. "Thus there emerge," they say (p. 767), "two cardinal characteristics of the phenomenon of premunition, which one finds in all the '*maladies infectieuses à prémunition*' of animals and of plants, caused whether by bacteria, by protozoa, or by the lower fungi, and even in the parasitic diseases caused by helminths."

The last part of the above quotation saves much elaboration, inasmuch as it obviates recapitulation of the teachings which our colleague E. L. Taylor has endeavoured with most laudable persistency to impart to our profession throughout his career—teachings which indeed rise much above the conceptual level of the ordinary taxonomic parasitologist as well as above that of the mere therapeutist. It is only in the light of our appreciation of a host-parasite relationship that must not be severed completely, to the fatal risk of the host in so doing, but rather retained in a state of least unstable equilibrium, that we can now clearly perceive the goal to be achieved when the constant impact of parasitism from the environment endangers the life of a host otherwise left fully susceptible by the application of eradication measures that are only partial in their effect.

Thus it is that in the case of the two major infectious diseases still afflicting the British cattle economy, namely, tuberculosis and brucellosis, we have reached to-day the position when we can clearly discern what are the measures to be applied to deal effectively with them. They are antithetic; but nevertheless each based on sure scientific foundations. Again, on equally sure scientific foundations, they are the opposite to those to be recommended for advocacy with the same infections in the British human economy.

The evolution of scientific thought culminating in the settling of the above notion may be said to date back to precisely the opening year of the half-century under review when M'Fadyean reported upon experiments carried out at the expense of the Royal Agricultural Society of England to a meeting of the Pathological Society of London on November 19th, 1901 (*Trans. Path. Soc. Lond.*, 1902, **53**); that is, shortly after the famous meeting of the British Congress on Tuberculosis held in London at which Koch made his pronouncement which led to the setting up of the Royal Commission on Tuberculosis, and the clear understanding which afterwards emerged of the essential differences among tubercle bacilli of the bovine, human, and avian types. In those experiments M'Fadyean showed clearly that cattle whether already harbouring a natural minute tuberculous lesion or artificially infected with tubercle bacilli from avian sources were rendered thereby resistant to massive subsequent intravenous injections of virulent bovine bacilli. At the time, however, he did not believe the finding could be put to practical use. Soon afterwards there were reported von Behring's classical experiments upon attempted immunisation of cattle with bacilli of the human type, then revealed to be of low virulence for cattle. In the subsequent tradition came M'Fadyean's experiments upon immunisation with bacilli of the avian type and again Calmette and Guérin's well-known researches upon immunisation with bacilli of the bovine type attenuated in virulence for cattle by prolonged cultivation on a bile-impregnated medium (BCG); and, again, more recently, the attempted use of the natural vole strain of tubercle bacilli to a similar end. All had a similar objective, namely, the establishment of a state of premunition against natural infection. It had been M'Fadyean's later belief, after accepting the validity of Calmette and Guérin's classic tests upon their premunised cattle kept at Lille during the First World War, that the method advocated by them would be a means of reducing morbidity to a satisfactory low level in a highly infected area pending recourse to total eradication in that area. Now it is becoming evident that such a preliminary "softening," particularly in the light of the recent Danish experiences, is not really necessary. Yet, in the case of human tuberculosis, where the ubiquity of infection renders any attempt at total eradication out of the question, some such premunition is essential in the case of individuals revealed by test to remain in a state of high susceptibility, if the present high death-rate from tuberculosis is to be lowered satisfactorily.

Again, early field observers upon contagious abortion in cattle had been struck with the discovery that although outbreaks varied greatly in severity all had one characteristic in common, namely, that the disease tended to extinguish itself, or, in other words, it was self-limiting. Hence, the unwisdom of disposing of cows that had already aborted and replenishing from sources in which the disease had not appeared. And so it came about as a natural corollary that after Bang and Stribolt in 1896 had discovered the cause to be a specific cultivable micro-organism, workers should explore the possibility of artificially anticipating the natural extinction of outbreaks by a premunition comprising appropriate culture inoculation, and exploiting, as in the case of several of such "*maladies infectieuses à prémunition*," the apparent constitutional resistance of the adolescent animal to the establishment of a severe carrier state. The gratifying results at last registered following upon systematic and widespread recourse to a system of inoculation conforming to the principles governing control of a disease that defies eradication and for which a true immunity cannot be devised, have been

so recently expounded, at the N.V.M.A. Congress at Cardiff (*Vet. Rec.*, 1950, **62**, 823) and elsewhere, that they need not be recapitulated again here.

The Virus Diseases

It was very late during the half-century under review that any precise knowledge became available regarding the real nature of the filterable viruses. When this was achieved, through studies principally upon the virus diseases of plants, it became increasingly evident, as had been already suspected by a few, that the disciplines acquired through concentration upon study of infectious diseases of bacterial origin, could with much advantage have been by-passed altogether. Much as the chance observation of the German chemist Wöhler in 1828 that the organic compound urea could be produced from the inorganic compound ammonium cyanate without the intervention of a postulated " vital force " bridged the gulf between inorganic and organic chemistry, so the observation of the American worker Stanley over a century later, in 1934, that the tobacco mosaic virus could be isolated in the form of a crystallisable high-molecular weight nucleo-protein bridged the gulf between the " living " and " non-living." Then, from a protein substance not differing much in size and properties from what we have now come to know to enter into the composition of normal cell protoplasm and to resemble closely the enzymes secreted in the digestive and other systems, an ascending scale of viruses of increasing size and complexity of organisation could be figured until finally they entered within the range of ordinary microscopy as in the case of the pox viruses and the rickettsiae. With further increase, micro-organisms which though still unable to survive except as obligatory parasites, like those of the brucella, pasteurella and haemophilus groups, appear which are cultivable artificially on suitable laboratory culture media, still provided no great strain is made on them to elaborate essential factors for their metabolism from the environment. We are well aware that a contrary hypothesis has been advanced which represents the viruses as degradation forms of more highly organised structures, but for our purposes here in depicting what is essentially the evolution of veterinary medicine the picture given is adequate.

Thomas Walley (1842-1894) writing in 1879 a well-known monograph entitled " The Four Bovine Scourges," that is, as menacing at that time Britain itself, gave major place to cattle plague (rinderpest), contagious bovine pleuro-pneumonia, foot-and-mouth disease, and tuberculosis. To an older generation memories of those scourges and the revelation of their causes lingered. First came the discovery in 1882 by Robert Koch of the cause of tuberculosis as a bacillus, which could be isolated in pure culture on laboratory media and reproduce the disease after continued culture; the growth requirements were certainly far more exacting than those of the bacillus of anthrax upon which he had first concentrated attention. Nevertheless, it was definitely cultivable. Next came the isolation in culture of the " virus " of pleuro-pneumonia by Pasteur's disciples, Nocard and Roux in 1898, using a technique of isolation that was still more exacting. Löffler and Frosch, 1897-1900, discovered, largely as the result of an accident, that the virus of foot-and-mouth disease passed through the earthenware tubes or plates that had been employed to separate living bacteria from their growth products in liquid culture media, and thus, for the first time, demonstrated that an animal disease could be set up by a " filterable virus," as had been already demonstrated by Beijerinck in 1892 in the case of the mosaic disease of the tobacco plant.

Soon there followed the discovery of other animal diseases as caused by " filterable viruses," such as South African horse sickness by M'Fadyean in 1900, fowl plague or pest by Centanni and Santonuzzi in 1901 in Italy where the disease first appeared and whence it soon spread to other countries, rinderpest by Nicolle and Adil Bey in 1902, and canine distemper by Carré in 1905; and, surprisingly, swine fever, in 1904, by Dorset and de Schweinitz in U.S.A.

The swine fever discovery was surprising because the disease had been long believed to exist as two distinct diseases, swine fever and swine plague, caused respectively by an enteric pathogenic bacterium, the hog-cholera bacillus (now *Salmonella suipestifer*) and a respiratory pathogen (now *Pasteurella suisepticus*) which we now realise to be secondary invaders. The swine fever story was later to be revealed as applicable to a large number of true virus infections such as swine influenza, the aetiology of which was brilliantly revealed by the American worker Shope in 1931, soon to be followed by the equally brilliant unravelling at last of a surprisingly closely related aetiology by Laidlaw and his co-workers for human influenza. Since Carré's announcement, attention had been so much distracted by insistence upon the aetiological importance of what later could be dismissed as mere secondary invaders in canine distemper that the veterinary world had to await the classic researches of Laidlaw and Dunkin published in 1926 and 1928. We can now appreciate their work for its supreme merit in presenting for the first time the disciplinary procedure that must be observed to obtain unequivocal results in research into a disease of virus origin; and, fresh from that discipline, Laidlaw and his team soon dissipated completely the age-long disputations surrounding the problem of human influenza. Again, therefore, what was the resolution of a major problem in human preventive medicine could, with sound reason, be ascribed to a pioneering triumph within the realm of veterinary medicine.

Nevertheless, until the third decade of the present century had got under way the procedures exploited to control " more scientifically " the huge mass of infectious animal diseases that were being discovered to belong to the rapidly expanding list of virus infections derived inspiration in the main from settled bacteriological techniques. This is evident, for example, if we read again the covering memorandum of the *Field* Distemper Committee prefacing Laidlaw and Dunkin's last summary of their work (*Vet. J.*, 1928, **84**, 598). There, the hope was being still entertained that an ultimate solution of the distemper problem would only be reached when the virus had been obtained in artificial laboratory culture. The methods of combating rinderpest in all territories within which eradication measures could not be enforced remained essentially similar in principle to those evolved during the great South African pandemic of 1896-1902 to which the names of Koch's assistants, Kolle and Turner, became attached and which comprised " passive immunisation " with a " hyperimmune anti-serum," converted, where the local circumstances permitted, into an " active immunisation " by simultaneous inoculation of fully virulent blood. Research stations overseas thus operated mainly as large-scale serum factories, maintained at considerable expense, in which routine production of " hyperimmune serum " seemed to have become a static enterprise. Even what seemed to be an important new development as represented originally by the discovery of an " inactivated vaccine "

by the Japanese in 1916 and its later improvement in the hands of the French workers Curasson and Delpy, in 1926, by introducing the technique of formalin inactivation, derived ultimate inspiration from the same source. For their method was copied quickly from that adopted by their compatriots, Vallée, Carré, and Rinjard, in producing an " inactivated vaccine " against foot-and-mouth disease, which again was in imitation of the important discovery by their colleague Ramon of the inactivation of toxic culture filtrates of the diphtheria and tetanus bacilli to produce innocuous immunising fluids—" anatoxins " or " toxoids."

The discovery by Pasteur in 1881 of his system of vaccination against anthrax by inoculation with the attenuated cultured bacilli and the discovery by von Behring in 1890 that diphtheria can be cured by the use of serum, prepared by injecting bacteria or bacterial products into a healthy animal, may be said to have set the aims to be achieved in the minds of most workers for several ensuing decades. Eighty-four years before Pasteur's discovery and long before even microscopy had entered within the current practice of any branch of medicine, Jenner had discovered, when he protected a child against smallpox infection by " vaccination " (*L. vacca*, a cow) with lymph from a cowpox or vaccinia lesion, a system of immunisation, which, for its complete efficacy, as Ledingham came to declare over a century later, must be reckoned as the touchstone by comparison with which all other subsequent immunisation procedures ought to be judged. The wonder is now that it did not remain a model—but perhaps its very simplicity did not commend it. How it came about that in India between the years 1922 and 1936 by combined laboratory and field endeavour and, following that model, the whole situation regarding, as high Government authority then put it, the major killing disease of hot climates, namely, rinderpest, became completely resolved, has recently been summarised adequately elsewhere (*Brit. Vet. J.*, 1948, **104**, 372; and 1949, **105**, 209, 332) and space need not be taken up again here for it.

In the same order comes the resolution of the fowl pox problem almost contemporaneously. Closely approximating, too, has been the resolution of the South African horse-sickness problem since the discovery by Alexander in 1933 that a neurotropic variant of the virus could be produced in mice following the model set by Hans Theiler's discovery that the human yellow virus could be induced to propagate restrictively in the cerebro-spinal system of these animals. The horse-sickness problem presented greater difficulties, inasmuch as several immunologically different variants were known to occur in the field, that problem of immunological variation in animal viruses having first been revealed by Vallée's important discovery in 1922 of the phenomenon as a complication in foot-and-mouth immunity.

Notable, too, among the researches in the virus field have been Pool's discovery in 1930 with his collaborators of the cause of louping-ill as a virus bearing naturally marked neurotropic affinities and the close resemblance between that virus, as revealed by subsequent studies, and the virus of human infantile paralysis. Similarly, the viruses of the Eastern and Western forms of equine encephalomeningitis appear to fall within a similar group and that of the long mysterious Indian equine disease *Kumri* may prove to be of the same order.

It would be tempting to continue the recital of advances within the fascinating field of virus research, and apology must be offered to the many workers in the field whose earnest labours to promote advance in it are not here mentioned. Three points in it, nevertheless, cannot be overlooked in any review, however brief:—

Firstly, the outstanding disclosure by Doyle in 1927 of the causation of Newcastle disease in fowls as a distinct and extremely lethal variant virus of the long known fowl plague virus—important though that discovery was in itself—soon demonstrated how a new and deadly virus infection may arise and quickly appear in most widely separated parts of the world, decimating as it did the host population in several territories before means could be devised to circumvent it.*

Secondly, if, by chance, the animal kingdom had not evolved beyond the stage reached by the Aves and the Mammalia had not emerged, we would now have little hesitation, following upon Rous's discovery of a filterable virus as the infective agent in fowl sarcoma, in generally ascribing malignant growths in tissue systems to the above category. What the connection can yet be between such growths in which there is a demonstrable virus and those in which none have been revealed but can be produced now almost at will by certain chemical reagents, seems to be within sight of resolution. Blakemore's important work on the neurolymphomatosis of fowls, commonly known as fowl paralysis, in which by careful breeding and observational technique he was able to disclose an antecedent generalised virus infection, may not be insignificant in bridging the gulf separating tumours of virus and apparent non-virus origin. We have but to recall that it was the very careful work of a Danish veterinarian, Jensen, that first gave impetus to modern cancer research by revealing the technique of tissue transplantation, so that even yet much may be contributed by veterinary medicine to the general fund in resolving one of the worst remaining evils in the shape of disease affecting mankind.

Thirdly, the question may well be asked, why with all the progress that has been registered in other fields of virus research, has no change taken place in policy regarding foot-and-mouth disease? The plain answer is implied in all that has been said in the foregoing pages: nothing whatever that has been discovered as eminently practicable in dealing elsewhere with other virus diseases could be entertained for a moment as a satisfactory alternative to the present well-tried system, which, for this island, so far as is foreseeable, must remain that of total eradication. In other territories, such as India or Egypt, where the disease is of minor importance compared with the still persisting local scourges, even the draconian method of rapidly spreading the disease among all cattle in a given locality at the beginning of an outbreak by mouth swabbing, to anticipate any possible rise in virulence after natural spread, may be fully justified; and there are means of vaccination available, as the result of the unremitting labours of research workers, which are not altogether unsatisfactory. But even if artificial means of protection were available equivalent in value to the best known, it is hard to see that their employment in this country would ever be justifiable, any more than, for example, as was stated at the beginning of this instalment, similar recourse

* These statements had been written and were in the press before the most disturbing announcements made during the past two or three weeks concerning the insidious spread of the infection in a new clinico-pathological form has presented a problem further illustrating the gravity of a situation that may arise through sudden virus mutations. Such dangers have been fully apprehended, as is well known, from an early stage of their researches by the highly competent workers engaged in this country and U.S.A. upon the resolution of the human influenza problem.

would be warranted in the case of anthrax. Nevertheless, the maintenance of a well-equipped system of research safeguards against eventualities that are not, for the moment, foreseeable.

Other Advances in Veterinary Preventive Medicine

The many aspects of advance within the nutritional, genetic, endocrinological and other fields which are possibly even more worthy of considered review than those aspects, which, in the mind of the writer, have received a treatment that is far too sketchy in the foregoing pages, must escape, at this stage, even mention.

Likewise, the many fine advances within the clinical field, particularly in anaesthesia and improved surgical techniques, must be left unreviewed.

It is the hope of the writer, in being privileged, however, on this auspicious occasion to write up this review, that those who enter the body corporate of veterinary surgeons now and during the coming half-century will have had displayed before them enough upon the achievements of their forebears during the past half-century to inspire them to hold their heads erect before the world and feel they have entered a calling, which is the promotion of further advance in veterinary medicine, well worthy of the exertion of their finest efforts and the preservation of their highest ideals.

(Concluded)

U.S.A. BRUCELLOSIS VACCINATION PROGRAMME

The following note, extracted from the *California Veterinarian* (4. (2.) 12) (1950) represents the references to the general U.S.A. brucellosis vaccination programme contained in a summary of a paper presented by A. G. Boyd, Assistant Administrator, Division of Animal Industry, at the annual convention (November 13th, 1950) of the Dairy Department of the California Farm Bureau, Berkeley, Calif.

"Since the brucellosis law became effective, January 2nd, 1948, to November 1st, 1950, 680,039 calves between the ages of six and 12 months have been vaccinated with *Brucella* strain 19 vaccine. There has been a steady increase in the number of calves vaccinated. The interest in vaccination on the part of beef cattle producers has been especially pleasing. During the past 12 months there have been 184,425 dairy calves and 71,380 beef calves vaccinated or a total of 255,805 calves. During this period 22,096 visits were made to ranches.

"Accredited practising veterinarians numbering 270 have conducted the actual vaccinations. As a whole they have done a splendid job. Contract veterinarians are paid 75 cents a head for vaccinations by the State and the State also furnishes the vaccine. The dry type vaccine, which has been used for the past two years, has been found to be satisfactory. One important phase of the work has been to require that samples of all lots of vaccine be submitted to the State Department of Public Health for test before being released in the field.

"During the past year meetings with contract veterinarians were held throughout the State to discuss the programme. Among other helpful information gained at these meetings was that veterinarians have noted a marked decrease in abortions in cattle. In this connection our laboratories have examined specimens from several herds experiencing some abortions and in no instance was the *Brucella abortus* organism recovered. At our suggestion the contract veterinarians have selected a committee of their own to act as a liaison group between the regulatory officials administering the programme and practising veterinarians doing the vaccinating against brucellosis.

"While we feel satisfactory progress is being made, the programme has reached the point where increased effort must be made to have all eligible calves vaccinated. A problem we have is to get full coverage in so far as small numbers are concerned. Intense educational work is indicated, and we are hopeful that we will receive increased assistance in this field."

SALMONELLA TYPHIMURIUM INFECTION IN DUCK EGGS AS A CAUSE OF HUMAN FOOD POISONING

BY

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In recent years reports of outbreaks of human food poisoning due to salmonella organisms have become more common and duck eggs have often been incriminated as a source of infection. The apparently increased incidence of these outbreaks may be due to an improvement in the methods of diagnosis and recognition of salmonella infections in the human rather than to the spread of this disease among ducks. The incidence of salmonellosis in ducklings has not increased during recent years, as judged by the number of outbreaks encountered annually in the poultry diagnosis laboratory.

The work described in this paper is to some extent a repetition of that of Gordon and Buxton (1945) and of Gillespie (1946), but it is considered worthy of publication, because, in spite of the increased number of reported outbreaks of human food poisoning caused by salmonella infections, there are few cases in which the chain of evidence incriminating the duck egg is complete.

History of the Outbreak

Salm. typhimurium was isolated from the stools of patients in an outbreak of disease which occurred at a school in the summer of 1949. The illness was characterised by sickness, diarrhoea and headache, with prostration and fever in the more severe cases. The main outbreak, in which 25 boarders and members of the staff were affected, appeared to have followed a meal which had included poached duck eggs. However, a delayed incubation period in many cases suggested that the eggs consumed at the meal were unlikely to have been the direct cause of disease. It was shown later that one of the dining hall attendants was a symptomless "excreter," and also that one of the kitchen staff had been suffering recently from sickness and diarrhoea, although examination of stools from this individual were negative.

About three weeks after the main outbreak, during which period duck eggs had not been served to children at the school, three more cases occurred among the staff. In one, the onset of violent symptoms took place within ten hours of the consumption of a boiled duck egg, but the sources of infection in the other two cases were not traced. In these latter cases both individuals had eaten a salad containing hard-boiled duck eggs, and this treatment should have destroyed organisms present in the yolk. It was considered more likely that contamination of the salad might have occurred during preparation in the kitchen from contact with other eggs soiled with infected duck faeces.

There were no fatal cases during the outbreak but some of the adult patients were seriously ill. The outbreak ceased with the removal of duck eggs from the school diet.

At no time were any cases reported in children who did not take their meals at the school.

All the duck eggs consumed at the school during this period were laid by a small flock which was kept on the school premises. The Medical Officer of Health suspected these birds of being the origin of the infection and *Salm. typhimurium* was subsequently isolated at the Regional Laboratory of the Public Health Service from eggs laid by ducks and collected from the school kitchen. The M.O.H. then approached the Divisional Veterinary Officer of the Ministry of Agriculture and Fisheries in order to arrange for the examination and blood testing of the whole flock.

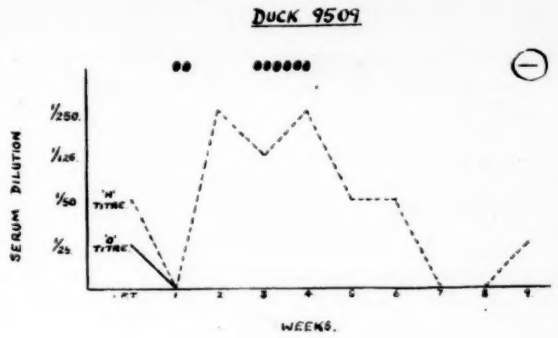
The Veterinary Officer carrying out this examination reported that the 32 ducks comprising the flock had been running in an orchard. They had no access to ponds or ditches and their only water supply was a small bath. At night they were shut into a small hen-house and under these conditions overcrowding would have occurred, resulting in unhygienic conditions; the ducks laid their eggs on the floor of the house and some faecal contamination of the egg shells would have been unavoidable.

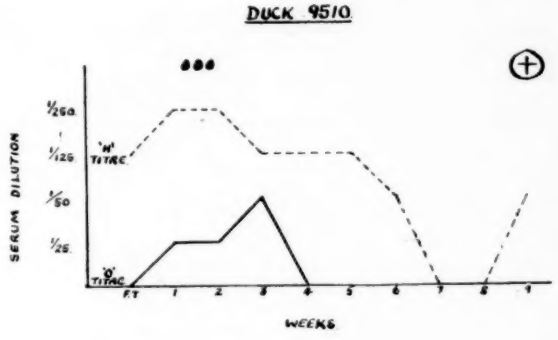
Blood samples were collected from the 32 ducks and examined at Weybridge for agglutinins to *Salm. typhimurium*. Only seven of the 32 ducks were negative to this test and the owners therefore decided to dispose of the whole flock. The eight birds which had given the highest titre at this test, together with the one which had already laid infected eggs, were transported to the laboratory. It is interesting to note that bird No. 9550, which had already laid infected eggs, gave only a doubtful reaction to the agglutination test on this occasion although it had already been shown to be a "carrier" of *Salm. typhimurium* (organism isolated from egg by Regional Laboratory, P.H.S.).

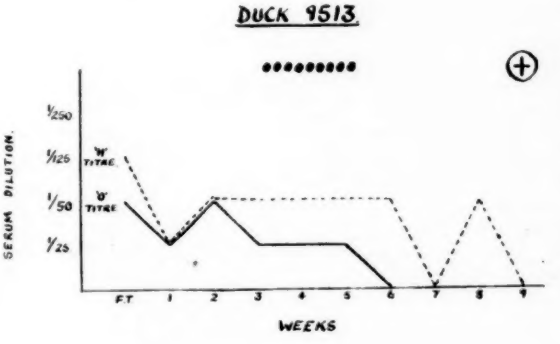
Laboratory Investigation

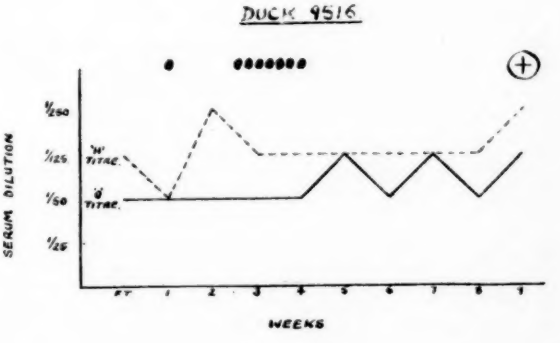
The nine ducks were housed individually in metal coops. Blood samples, cloacal, and faecal swabs were collected weekly and all eggs were examined bacteriologically. A total of 60 eggs was obtained during the experimental period from eight ducks. One bird never laid at all during this period and none of them laid for longer than five weeks after arrival at the laboratory. After nine weeks all had ceased to lay, were killed, and subjected to a detailed bacteriological examination.

The results of blood tests, and of the other examinations are presented on graphs.



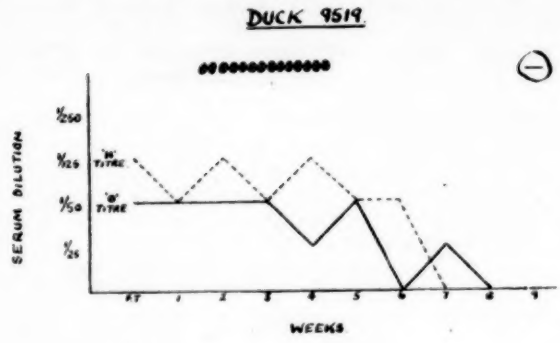


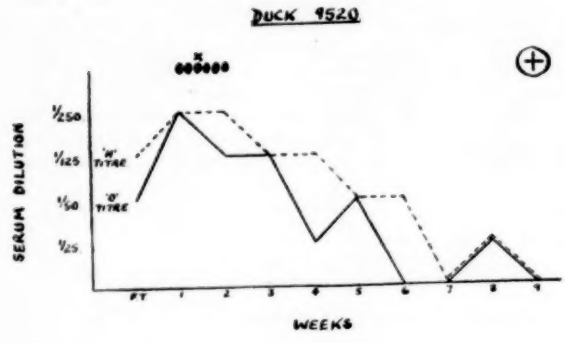


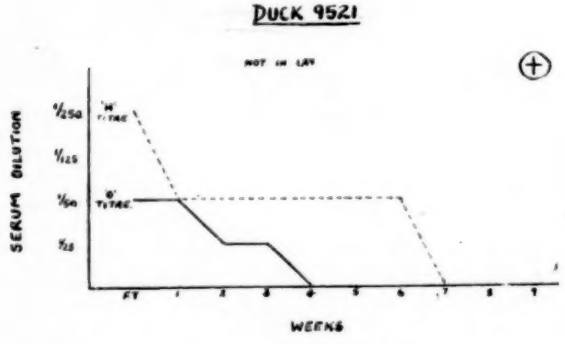


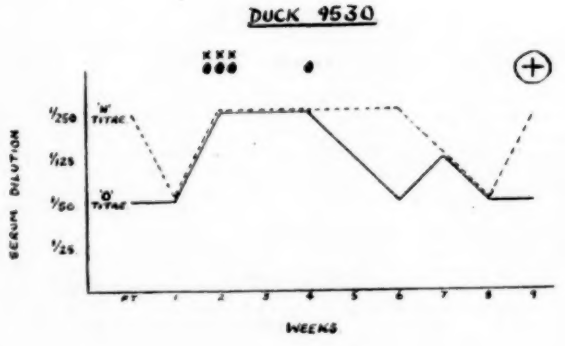
KEY TO GRAPHS.

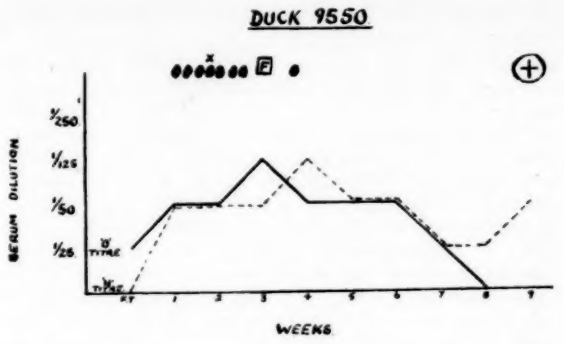
- ● = EGG LAID
- X = INFECTED EGG.
- F = S. TYPHI-MURIUM ISOLATED FROM FAECES.
- ⊕ = S. TYPHI-MURIUM ISOLATED ON POST-MORTEM EXAMINATION.
- ⊖ = NO SALMONELLA ORGANISMS ISOLATED ON POST-MORTEM EXAMINATION.
- F.T. = FLOCK TEST (ORIGINAL).











Methods and Techniques Employed

(a) *Blood tests.*—Tube agglutination tests in dilutions of 1 in 25, 1 in 50, 1 in 125 and 1 in 250 were carried out using the M.R.C. drop method. Each serum was tested against a (I), IV, (V), XII, "O" antigen and an "H" composite antigen containing the i specific and 1, 2, 3, non-specific antigens. The highest dilution of serum in which +++ agglutination occurred with complete clearing of the supernatant fluid was considered to be the titre of the sample and is the figure shown on the graphs. The "H" titres were read after two hours' incubation in a water bath at 56° C. and the "O" titres after incubation at the same temperature overnight.

(b) *Examination of eggs, cloacal and faecal swabs.*—These examinations were carried out using, with minor alterations, the techniques described by Gordon and Buxton (1945) and Buxton and Gordon (1947). Selenite F enrichment medium (Mackie and McCartney, 1948) was used in place of tetrathionate broth for all primary cultures.

Of the 60 eggs examined in this manner, *Salm. typhimurium* was isolated from five eggs laid by three of the eight ducks which were actually in production. Three of four eggs laid by No. 9530 were infected, one of six laid by No. 9520 and one of eight laid by No. 9550. The remaining 55 eggs were examined with negative results.

The organism was isolated from the shell, yolk, and yolk and white of three of the five positive eggs, from the yolk and white of one, and from the shell only of the other.

With one exception, when the organism was isolated from duck No. 9550, examination of faecal and cloacal swabs gave negative results.

(c) Post-mortem *examination of ducks.*—A detailed bacteriological examination was carried out on each bird. The carcases were opened with sterile precautions. Direct cultures were made on MacConkey's agar and into peptone broth tubes from organs and tissues showing lesions such as degenerated ova and detached pieces of egg material. A portion of liver (approximately half a lobe) and the whole spleen were ground up in a mortar with a small quantity of selenite medium and the mixture, after maceration, was tipped into a flask containing 100 ml. of the same medium. The gall-bladder was stripped out and treated in the same way. The whole ovary, less any degenerated ova which may have been cultured individually, and a portion of the oviduct were then cut out and similarly treated in separate flasks. The flasks were incubated for 24 hours, the contents plated on MacConkey's agar and the resulting growths on the plates examined after 24 hours' incubation.

Salm. typhimurium was isolated from the ovary, degenerated follicles or detached pieces of encapsulated egg material in five of the nine ducks, from the liver and spleen

of one, and from the ovary only of another. The organism was not isolated from the two remaining birds.

All nine ducks were in excellent bodily condition, when killed for examination, and in every case the ovary was quite inactive. An unusual feature was the frequent occurrence of degenerated follicles, containing inspissated yolk, which were scattered throughout the abdominal cavities; the majority were attached to the bowel, but in some cases they were found adherent to the peritoneum on the abdominal wall. *Salm. typhimurium* was usually isolated in pure culture from these lesions.

The typing of *Salm. typhimurium* isolated during these investigations was based on the carbohydrate fermentation reactions of the organism and its agglutination by specific sera using the rapid slide and tube methods of testing.

Phage-typing of the organism.—The seven cultures of *Salm. typhimurium* isolated from the ducks, together with three of those obtained from eggs and the single culture from a faecal swab, were sent to Dr. A. Felix, of the Central Enteric Reference Laboratory, for phage-typing. Dr. Felix reported that the eleven ducks' strains and the two strains previously isolated from patients in the outbreak of food poisoning at the school all belonged to the Vi-phage Type Group 2, according to the typing scheme of Felix and Callow. The typing of *Salm. typhimurium* by anti-Vi-phages has been mentioned briefly in a paper by Felix and Callow (1943), but the provisional typing scheme now in use has not yet been published (Felix and Callow, personal communication).

The Eradication of Salmonella Infections in Ducks

The results of the blood agglutination tests on the group of infected ducks in this investigation emphasise the particular difficulties which exist in the control of this disease in ducks. There was a significant drop in both the "O" and "H" serum titres soon after the ovaries ceased to be fully active, and *Salm. typhimurium* was isolated from the inactive ovaries and other organs of seven ducks, although only four of them had given a positive agglutination titre at the test carried out seven to 14 days before they were killed. These results support the opinion, expressed by Gordon and Garside (1944) and again by Gordon and Buxton (1945), that the routine blood testing of ducks is of doubtful value as a means of detecting infected birds in a flock. It is clear that repeated testing over a considerable period would be necessary before negative results could be accepted as evidence that the organism was no longer present in the organs of individual ducks, particularly if the flock was not laying and the ovaries were inactive when the tests were carried out.

Summary

Nine ducks were obtained from a flock which was suspected of having been the source of *Salm. typhimurium* infection in an outbreak of human food poisoning.

Tube agglutination tests were carried out on blood samples from them every week for nine weeks; all eggs laid, and cloacal swabs collected periodically, were examined bacteriologically. At the conclusion of the experiment the ducks were killed and a detailed *post-mortem* and bacteriological examination was conducted on each.

Salm. typhimurium was isolated from the ovaries and other organs of seven of the nine ducks, from five of the 60 eggs laid by eight of them and also from one faecal swab. These cultures were shown by phage-typing to belong to the same group as the strains isolated from the stools of patients who had suffered from gastro-enteritis thought to

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be associated with the consumption of eggs from the same flock of ducks.

The blood sera of only four of the seven ducks, from which the organism was isolated, agglutinated specific antigen to a titre which would have been regarded as positive at a routine test, seven to 14 days before they were killed.

Acknowledgments.—Acknowledgments are due to Dr. F. Lawrence Smith, M.O.H., for providing the detailed history of the outbreak of food poisoning; to Mr. E. G. Lamb, Veterinary Officer of the Animal Health Division, for examining the flock of ducks at the school and collecting blood samples; to Dr. A. Felix, of the Central Enteric Reference Laboratory, for so kindly carrying out phage-typing of the cultures and for helpful criticisms in the presentation of the results obtained.

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CLINICAL COMMUNICATIONS

A NOTE ON THE USE OF HEXAMINE IN THE TREATMENT OF TETANUS IN THE HORSE*

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In the prophylactic treatment of tetanus great advance has been made within recent years with the introduction of tetanus toxoid. Unfortunately the same cannot be said about the curative treatment, and it has been estimated that of all horses that contract the disease approximately two-thirds die, and in the acute form the percentage is considerably higher.

The chief difficulty in treatment by antitetanic serum is that the serum proteins, which contain the specific immune properties, are of a molecular size too large to pass through the "blood-brain-barrier," such as the capillaries of the choroid plexus, etc., which supply the brain and other parts of the central nervous system. The so-called immune bodies after subcutaneous, intravenous or even intrathecal injection are unable to come into contact with the tetanus toxin already attached to the cells of the central nervous system, and consequently are unable to neutralise it. The "blood-brain-barrier" is not only impermeable to tetanus antitoxin but also to almost all medicinal agents, with one notable exception, *viz.*, hexamine (urotropin).

This drug has been known for many years to be able to traverse the renal capillary plexus, and has consequently been extensively used for affections of the uro-genital tract. Similarly hexamine not only traverses the "blood-brain-barrier," but also renders the barrier permeable to other agents, notably tetanus antitoxin, which would otherwise be incapable of passing through it.

Since this knowledge became available nearly 20 years ago a number of cases of human tetanus have been treated by a combination of hexamine and antitetanic serum with highly encouraging results, and the technique eventually

* Presented to the East Midlands Division, N.V.M.A., at Sutton Bonington, March 14th, 1950.

evolved consisted of:—Injection of a large quantity of serum, 20 c.c. or more intravenously, or subcutaneously if the former was not possible, followed in half an hour by intravenous or subcutaneous injection of hexamine, or the drug could be given by the mouth if desired. This was followed half an hour later by injection intravenously, or subcutaneously, of further quantities of serum, depending on the severity of the case, and the percentage of recoveries was highly gratifying, certainly far higher than with any previous form of treatment—in fact, 17 cases were recorded with only one death.

In view of these excellent results I had for some time contemplated trying this treatment on a horse when a suitable case came along, and I had the opportunity early this year.

On January 8th, 2 p.m.—I was called to a valuable aged hunter gelding which showed well-marked symptoms of tetanus, following a small punctured wound on the off hind fetlock sustained eight days previously. The horse was given 500,000 units of penicillin intramuscularly at once, and 50,000 units of tetanus antitoxin intravenously. Further treatment carried out on the case was briefly as follows:—

January 8th, 10 *p.m.*—2 drams of hexamine given intravenously in 50 c.c. of water, followed by 50,000 units of antitoxin intravenously. 1 oz. of hexamine was made up into an electuary with treacle and left with the groom with instructions to use it all during 24 hours.

January 9th, 10 *a.m.*—Horse very stiff and showed marked trismus. 25,000 units antitoxin given subcutaneously.

2 *p.m.*—25,000 units antitoxin given subcutaneously.

10 *p.m.*—2 drams hexamine intravenously in 50 c.c. water, followed by 50,000 units antitoxin intravenously.

January 10th, 10 *a.m.*—1 oz. hexamine given in treacle as before. The horse was sweating badly and blowing.

10 *p.m.*—2 drams of hexamine in 50 c.c. water given intravenously followed by 50,000 units antitoxin intravenously.

January 11th, 10 *a.m.*—Horse seemed better and was not sweating. 50,000 units antitoxin given intravenously.

10 *p.m.*—2 drams hexamine in 50 c.c. water intravenously and 50,000 units antitoxin intravenously.

January 12th, 10 *a.m.*—25,000 units antitoxin subcutaneously and 1 oz. hexamine left in treacle electuary.

10 *p.m.*—2 drams of hexamine in 50 c.c. water intravenously, and 25,000 units antitoxin intravenously.

January 13th, 10 *a.m.*—25,000 units antitoxin subcutaneously. 1 oz. hexamine in electuary left.

10 *p.m.*—25,000 units antitoxin subcutaneously.

January 14th, 10 *a.m.*—1 oz. hexamine left in electuary.

10 *p.m.*—25,000 units antitoxin subcutaneously.

January 15th, 10 *a.m.*—25,000 units antitoxin subcutaneously and 1 oz. hexamine left in electuary. Horse appeared definitely to be improving.

January 16th, 10 *a.m.*—Horse appeared much better and was moving freely round the box, and feeding well. No treatment given.

January 17th.—Groom stated that the horse went down in the box without warning at about 8 a.m., when apparently doing well. Efforts were made to get him on his feet, but without success. Owing to a misunderstanding I did not see it till early afternoon, when its condition was hopeless and I destroyed it immediately.

This was a disappointing ending to a case which appeared to be well on the way to recovery.

I am fully aware that one case amounts to little or nothing, and I have had a number of cases recover without hexamine, and with infinitely less antitoxin than this horse received, while, of course, many horses have got better with no specific treatment at all. My object, however, in recording this treatment is because, in my opinion, it is the most rational yet evolved, and I trust you will give it a trial and report your successes or failures.

I am indebted to Professor George Dykes, of Glasgow Veterinary College, who first drew my attention to the use of hexamine in this connection, and to an excellent article on "The Treatment of Tetanus," in *The Veterinary Record* for May 29th, 1948, abstracted by J. T. E.

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CORTICAL CEREBELLAR DISEASE IN AN AYRSHIRE CALF

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Introduction.—Congenital cerebellar diseases have been described in various species of animals. The literature on the subject was briefly reviewed by Innes, Russell and Wilsdon (1940), and by Innes, Rowlands and Parry (1949). Innes *et al.* (1940) described a familial cerebellar hypoplasia and degeneration in Hereford valves. The symptoms were present at birth and included inability to rise, attempts to rise using the fore feet first, opisthotonus, and a typical posture with limbs and head extended. The lesions were confined to the cerebellar cortex.

The purpose of the present communication is to draw attention to a similar disease in another breed of cattle.

Subject.—The subject was a six months' old Ayrshire calf which had been affected from birth. The animal came from a pedigree attested herd in which there was no previous history of any other congenital abnormalities. The calf was sent to the Department of Veterinary Pathology, and kept under close observation for six weeks.

Symptoms.—The calf tended to stand with its fore limbs straddled, and when disturbed it moved awkwardly with a tendency for a circling movement to the left. The animal had difficulty in gaining its feet and immediately after rising there was inco-ordination of the hindquarters. Defaecation and urination were normal as were the pupillary and corneal reflexes. Excessive noise did not disturb the calf, and it did not appear to be deaf. There was a history that the calf had had a number of "fits." The animal was seen during one of these attacks; after a number of clonic spasms the calf lay flat on its side with its head arched and all the limbs rigidly extended. During the time the animal was under observation its condition remained good, and the clinical syndrome unchanged.

The animal was destroyed by an intravenous injection of magnesium sulphate.

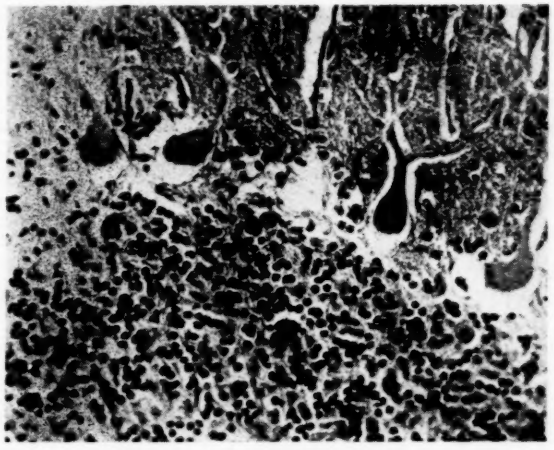
Post-mortem Examination.—The carcase was that of a well-developed male calf. No gross abnormalities were noted in the thoracic or abdominal viscera. Examinations of the brain and cord revealed a cerebellum smaller than normal and a reduction in the amount of cerebellar white matter. Tissues were fixed as soon as they were removed from the body and histological examinations carried out.

Microscopic Changes.—The changes present were confined to the cerebellum and involved all lobes to the same extent. The molecular layer was reduced in thickness and was smaller than the granular layer. In one or two areas it was more cellular than normal. There were very few microglia and astrocytes, but an increased number of fairly large round or oval cells, which were thought to be neuro-

blasts. The granular layer was enlarged, very cellular and in places encroached upon the white matter.

The most prominent changes were seen in the layer of Purkinje cells, which were reduced in number and showed what appeared to be a series of changes. About one-third of the cells had lost their nuclei, showed a peculiar granular cytoplasm and exhibited crenation of their edges.

In the Purkinje layer spaces showing fibrillar baskets were seen which had been occupied by Purkinje cells. The appearance suggested that the cells had " dropped out of the section." These changes are well shown in the accompanying photograph.



There was no evidence of inflammatory or other changes in the cerebrum or spinal cord. There was no evidence of demyelination in the spinal cord or brain tissue.

Discussion.—The clinical syndrome was not like that noted by Innes *et al.* (1940) in Hereford calves, in which there was complete inability to stand. The symptoms, however, resembled those described in lambs by Innes, Rowlands and Parry (1949). Innes *et al.* (1940) termed the condition cerebellar hypoplasia. They regarded the paucity of cells in the granular layer, the appearance of neuroblasts in the molecular layer, the absence of myelin changes and the normal structure of the microglial cells as indicating hypoplasia. They thought that the changes they described in the Purkinje cells indicated a degenerative process.

In the present case the damage to the Purkinje cells was not dissimilar from that seen in the Hereford calves, but the changes in the granular layer were unlike those described by Innes *et al.* (1940). The granular layer was very cellular and appeared to encroach into the white matter and the molecular layer. The presence of the degenerated Purkinje cells and the empty baskets indicated that the condition was not due to a hypoplasia of these cells. The microscopic changes in the cerebellum resembled those seen in lambs by Innes, Rowlands and Parry (1949), and called by them cortical cerebellar atrophy (daft lamb disease).

Summary

A case of congenital cerebellar disease in an Ayrshire calf is described.

Acknowledgments.—We wish to acknowledge the helpful advice and criticism of Professor R. E. Glover, and to thank Mr. H. P. Harding, M.R.C.V.S., for the photomicrograph.

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ABSTRACTS

[Laboratory Diagnosis of Icterus in Foals. Bruner, D. W. (1950.) *Cornell vet.* **40.** 11–16.]

Laboratory diagnosis of haemolytic icterus in foals is aided by the finding of specific erythrocyte-destroying antibodies in the blood of the mare. Mares which have produced icteric foals are sensitised to the erythrocytes of the stallions to which they were bred. Foals from sensitised mares are normal when born but become icteric when they have absorbed the specific erythrocyte-destroying antibodies contained in their dam's colostrum.

Blood agglutination tests were carried out on 350 mares, and only those 33 which had produced icteric foals exhibited an haemagglutinin titre of 1 : 2 or higher. The titre of the mare at the time its foal was affected varied from 1 : 4 to 1 : 64 when tested against the red blood cells of the foal's sire. A year later in those showing the highest titre and when the mare was barren, the titre fell to 1 : 2. One mare was found whose erythrocytes were agglutinated by the serum of the 33 known affected mares. This mare's cells were used successfully as a substitute when stallion cells were unavailable.

By testing the erythrocytes of the new-born foal with its dam's serum before it is suckled, it is possible to select those foals which will develop icterus. If there is no reaction, it is safe for the foal to receive its dam's colostrum. A strong reaction, however, is dangerous. A colostrum test on these lines may also be carried out.

A pre-mating test can be made by testing the serum of the mare with the red cells of the chosen stallion ; if there is no clumping of the latter in a dilution of 1 : 2 of the mare's serum, the foal will not be icteric. The preparation of materials for the carrying out of the tests is described in detail.

N. S. B.

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[Q-Fever in Great Britain. Stoker, M. G. P., & Marmion, B. P. (1950.) *J. Bact.* **62.** 134.]

Q-fever, caused by *Rickettsia burneti*, was first described in Queensland, Australia, in 1937 and is generally diagnosed as primary atypical pneumonia. More recently it has been recognised in the U.S.A., Central Europe and the Mediterranean littoral.

As it seemed possible that some of the so-called virus pneumonias in this country might be caused by *Rickettsia burneti*, serum from cases of atypical pneumonia was examined for Q-fever complement fixing antibodies. In two years eight of 366 samples showed evidence of Q-fever. Though almost half of the 366 patients came from London none of the eight positives lived in London.

The first recognised outbreak occurred in July, 1949, when a nurse and pathologist having no social or direct connection became ill and *R. burneti* was isolated from the pathologist by inoculation of a guinea-pig.

It was found that the pathologist had made a *post-mortem* examination of a patient dead from pneumonia from the nurse's ward, and that she had laid out the body. Further enquiry showed that another pathologist and mortuary attendant who had been present at the *post-mortem* examination had also

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Innes, J. R. M., Russell, D. S., & Wilsdon, A. J. (1940.) *J. Path. & Bact.* **50.** 455.

——, Rowlands, W. T., & Parry, H. B. (1949.) *Vet. Rec.* **61.** 225.

become ill at the same time. All four showed evidence of infection with *R. burneti*.

The deceased patient, who came from a north-east Kentish coastal town, apparently had been admitted to hospital for another complaint during the incubation period of Q-fever. His widow was visited and gave serological evidence of Q-fever and finally histological examination of his lung confirmed the diagnosis and view that he was the origin of the outbreak.

Californian workers had shown that cases occurred in proximity to dairy farms, that many cows were infected and that *R. burneti* was present in a high proportion of unpasteurised milk samples.

The patient had no direct contact with cattle but the milk from farms supplying his dairy was found to be infected. The dairy workers and farmers themselves showed serological evidence of infection. A search is being made for other reservoirs of infection and possible invertebrate vectors are being examined. Serological evidence of infection has already been found in cases in two other parts of England.

The diagnosis of Q-fever should be considered in non-bacterial pneumonias and depends largely on complement fixation with the specific rickettsial antigen.

J. S. S.

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[Effect of Young Grass in the Diet on the Onset of Sexual Maturity in Mice. Evans, J. A., & Evans, W. C. (Dept. of Animal Health, University College of Wales, Aberystwyth). (1949.) *Nature*, London. **163.** 908.]

The superior nutritive qualities of spring grass as compared with autumn growth or aftermath are well known. Increasingly of late it has become evident that young grass may have the property of influencing the endocrine system in such a way as to have a direct bearing on reproduction as well as on productivity. To obtain light for further enquiry, groups of young female mice were fed, respectively, on an adequate basal diet, and the same basal diet to which either fresh or dried grass had been added. The rate of body weight gain was the same in all three groups but the average time of vaginal opening occurred ten days earlier in the mice fed fresh grass and eight days earlier in the mice fed dried grass. The response suggested a small intake of oestrogenic material which may be found in grass.

J. T. E.

Weekly Wisdom

Man is now conscious of himself as man, over against the necessities of nature, and is making proud claims to his prerogatives. Yet at the same time he believes himself friendless and a stranger in the universe—alone in a vast, terrifying mechanism which knows no love, no justice, no pity, nothing which satisfies his deepest hungers. With God left out the dream has become a nightmare. And this false demand for independence, so far from enhancing the dignity of man, ends by making him the slave of process, and reduces him to a sub-human status. If he can but recapture the Christian insight "man (says Richard Law) can be free again: what is more, he can be man again."—The Times (contributor of weekly religious feature).

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Mycological Reference Laboratory: Public Health Laboratory Service (Medical Research Council).—Following the resignation at the end of 1950 of Dr. R. W. Riddell, Dr. Jacqueline Walker has been appointed Acting Director of the laboratory. Specimens for examination for pathogenic fungi should be addressed to her at the Mycological Reference Laboratory, London School of Hygiene and Tropical Medicine, London, W.C.1.

REPORT

ANNUAL REPORT ON THE EAST AFRICAN HIGH COMMISSION, 1949*

The East African High Commission represents the present-day conception of closer union within the East African territories of Kenya, Uganda and Tanganyika. The formation of this Commission, which consists of the Governors of Kenya, Uganda and Tanganyika, came into effect on January 1st, 1948. Its chief function is the administration of various inter-territorial services and for this purpose there are four principal executive officers, the Administrator, the Commissioner for Transport, the Finance Member and the Postmaster-General.

The East African Central Legislative Assembly is presided over by a Speaker and consists of representatives both official and non-official from the territories concerned. It has fairly wide powers but does not in any way interfere with the constitution or administrative responsibilities of the Governments of the three territories.

The research and scientific services within the High Commission are of special interest to the veterinary profession and consist of:—

(1) The East African Agriculture and Forestry Research Organisation (E.A.A.F.R.O.).

(2) The East African Veterinary Research Organisation (E.A.V.R.O.).

(3) The East African Tsetse and Trypanosomiasis Research and Reclamation Organisation (E.A.T.T.R.O.).

Other research and scientific services deal with Fisheries Industrial Research, Meteorological Services, Statistica Services and Medicine. Of the medical activities an East African Medical Survey, a Filariasis Research Unit and Research into Relapsing Fever, are of interest.

E.A.V.R.O. had rather a chequered career during 1949 and it was decided to establish all central activities in the Muguga area close to the Agricultural and Forestry Research Headquarters. Here there are 900 acres available and long range research on major animal disease problems of wide inter-territorial significance and the manufacture of biological products will be carried out.

Research on bovine pleuro-pneumonia, trypanosomiasis with special reference to antrycide in co-operation with E.A.T.T.R.O., a tuberculosis survey and other work was in hand during the year.

* Colonial No. 263. H.M. Stationery Office. Price 1s. 6d.

PENICILLIN MEDICATION AND CHEESE-MAKING

The following note in the issue of the *British Medical Journal* of December 30th adds a reference to official action which forms an interesting supplement to the detailed reply given under the above heading in our "Questions and Answers" feature of June 4th, 1949:—

"Cows given penicillin as treatment for udder inflammations discharge enough of the antibiotic in their milk to kill the bacteria essential for normal cheese-making. This is still so when the milk from a cow under treatment is mixed with the milk of 200 normal cows, and consequently is a serious threat to the cheese industry. In Sweden, according to the Swedish International Press Bureau, steps are now being taken jointly by the dairymen and the Veterinary Board to ensure that penicillin is used only when really necessary, and that the milk from treated cows is kept separate."

REVIEW

[**Animal Diseases in South Africa.** By M. W. Henning Second Edition (1949). Central News Agency, Ltd., Johannesburg, South Africa. £3 5s.]

The first edition of Professor Henning's excellent text-book on "Animal Diseases in South Africa" was published in 1932 and this new revised edition is very welcome. In order to accommodate the vast amount of new knowledge which has accumulated during this interval the author has restricted the subject matter to a consideration of the infectious diseases of animals. The book is now published in one volume of 879 pages and the section on diseases caused by plant poisons, which was a feature of the first edition, has been omitted, for the author considers that this subject is covered in Steyn's recent text on the "Toxicology of Plants in South Africa."

The book has been thoroughly revised and brought up to date. Although the author states that, because of the conditions prevailing during the time of his revision, he was unable to consult all the literature, the references appended to each chapter are very complete. A number of diseases that were not dealt with in the first edition have now been included. The book is divided into three sections dealing with the bacterial diseases, protozoal diseases and diseases caused by viruses and rickettsias. Each disease is treated in a separate chapter and is covered exhaustively; to the reviewer, the historical introduction to each chapter, in this edition as in the first edition, is particularly interesting and pleasing. Following the historical introduction each chapter gives a detailed account of the morphology, life-history and ecology of the organism, together with a complete picture of the symptoms, pathogenesis and treatment of the disease. In addition, at the appropriate place the author discusses such topics as the epidemiology of the various diseases, the public and animal health inter-relationship, and the effectiveness of different methods of treatment and prophylaxis.

The author has written the book to cover infectious diseases of animals in South Africa and while, of course, it will be of inestimable value to veterinarians in that country it will be of no less value to many workers in other countries, especially those in other parts of Africa. The monographs in the sections on protozoal diseases and diseases caused by viruses and rickettsias furnish the most complete and reasonable account, from all the various aspects in which these conditions may be viewed, which is available to-day. Those veterinarians working in temperate climates, who may never encounter such diseases as East Coast fever or African horse sickness, will find complete accounts, which are of the highest quality, of the bacterial diseases such as tuberculosis, Brucellosis and anthrax.

The reviewer recommends this excellent book to all those interested in animal disease and animal health; there is very much of value to field worker, clinician, laboratory worker, teacher and student. Finally, he would like to congratulate Professor Henning on his admirable revision of an already admirable contribution to veterinary literature.

THREAT TO BAN LIVESTOCK OFF ROADS

Surrey F.U. have sent a protest to the County Council against the introduction of a new by-law which would make it an offence to ride, lead or drive livestock on any road margin to which the by-law applied. It was emphasised that from time immemorial owners of livestock had had the right to drive their animals along the public highway, and under this proposed by-law some farms, particularly those in urban areas, would almost be put out of business. This would hit production, especially of milk, as it would mean that it would not be possible to use the buildings and drive the cattle to pasture.—*Farmer & Stock-breeder.*

NOTES AND NEWS

Diary of Events

Jan. 27th.—Meeting of the Biochemical Society, in the Post-graduate Medical School, Ducane Road, London, W.12, 10.30 a.m.

Jan. 27th.—Meeting of the British Association of Allergists, at the Royal Society of Medicine, 1, Wimpole Street, W.1, 2.30 p.m. (Discussion on Veterinary and Comparative Allergy).

Jan. 30th.—Meeting of the Western Counties Division, N.V.M.A., at Exeter (Royal Clarence Hotel), 2 p.m.

Jan. 31st.—Royal (Dick) Veterinary College Annual Ball, in the Assembly Rooms, George Street, Edinburgh, 8.30 p.m.

Jan. 31st.—Meeting of the West of Scotland Division, N.V.M.A., in the Glasgow University Veterinary School, 2.30 p.m.

Feb. 1st.—Meeting of the Southern Counties Division, N.V.M.A., at Bournemouth (Grand Hotel), 6 p.m.

Feb. 1st.—Meeting of the Central Division, N.V.M.A., at the Royal Veterinary College, Camden Town, N.W.1, 6 p.m.

Feb. 2nd.—Annual General Meeting of the North of Ireland Veterinary Medical Association at the Veterinary Research Division, Stormont, Belfast, 2.15 p.m.

Feb. 7th.—Meeting of the Lancashire Division, N.V.M.A., at the Veterinary Hospital, Liverpool, 2.30 p.m.

Feb. 14th.—Meeting of the Editorial Executive Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 2.30 p.m.

Feb. 15th.—Meeting of the Herts. and Beds. Veterinary Society at Luton (The George Hotel), 2.30 p.m.

Feb. 20th.—Annual General Meeting of the Eastern Counties Division, N.V.M.A., at Norwich (Bell Hotel), 11 a.m.

Feb. 22nd.—Annual General Meeting of the South-Eastern Division, N.V.M.A., at Maidstone (Royal Star Hotel), 2.30 p.m.

Feb. 23rd.—Liverpool University Veterinary Society's Annual Ball.

QUARTERLY MEETINGS OF COUNCIL AND STANDING COMMITTEES N.V.M.A. DURING 1951

The following dates have been fixed for remaining meetings this year, chiefly to give members plenty of time to reserve hotel accommodation.

In London

Monday, April 16th:
2 p.m. Organising Committee
4 p.m Parliamentary and Public Relations Committee.

Tuesday, April 17th:
10 a.m. Veterinary State Medicine Committee.
12 noon Home Appointments Committee.
2.15 p.m. General Purposes and Finance Committee.

Wednesday, April 18th:
11 a.m. Council

In Edinburgh

Wednesday, July 11th:
11 a.m. Home Appointments Committee.
2 p.m Organising Committee.
4 p.m. Parliamentary and Public Relations Committee.

Thursday, July 12th:
11 a.m. Veterinary State Medicine Committee.
2 p.m. General Purposes and Finance Committee.

Friday, July 13th:
11 a.m. Council.

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Appointments Overseas

Members who are offered posts in the Colonial Veterinary Service or elsewhere abroad and who may need further information on any particular point before coming to a decision, are advised to consult the General Secretary, N.V.M.A.

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R.C.V.S. Council Election

The Registrar, R.C.V.S., would remind all members that the closing date for the receipt of nomination forms for the forthcoming R.C.V.S. Council election is January 31st. Nomination forms may be obtained on writing to him at 9, Red Lion Square, London, W.C.1.

Supplementary Veterinary Register

The first appeals to be decided under the Veterinary Surgeons Act, 1948, were heard on Tuesday, January 23rd last, by a Divisional Court of the King's Bench Division consisting of the Lord Chief Justice and Mr. Justice Devlin.

The four appellants were employees of the People's Dispensary for Sick Animals who had been working in Paris, Tangiers, Egypt and South Africa respectively. The Council, R.C.V.S., had refused registration on the grounds that the principal means of the appellants had not been the necessary diagnosis and treatment laid down by the Act for the required time *in the United Kingdom*.

The appeals were based, amongst other matters, on the proposition that, as the appellants were under contracts of service to an organisation based in the United Kingdom, their work could in law be regarded as being within the United Kingdom for the purposes of the Act. Also the proposition was put forward that their work, as maintaining British prestige abroad, could be regarded as work of national importance allowing the Council, R.C.V.S., a discretion under the Act to register.

After hearing the appellants' case the judges indicated that it was not necessary for the R.C.V.S. to argue the case. Judgment was immediately given dismissing the appeals with costs in favour of the R.C.V.S.

A full report will be given at a later date.

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PERSONAL

Conferment of R.C.V.S. Fellowship.—The Fellowship of the Royal College of Veterinary Surgeons has been conferred on Mr. William J. McIlroy for his thesis "Whaling and Whalemeat Production in the Antarctic."

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Marriage.—JENKINS—HARVEY.—On January 20th, 1951, at Holy Cross Church, Carshalton, Peter Jenkins, M.R.C.V.S., elder son of Mr. A. W. Jenkins, M.B.E., and Mrs. Jenkins, 73, All Saints Road, Sutton, Surrey, to Deirdre, younger daughter of Mr. G. W. Harvey and Mrs. Harvey, 2, Willis Avenue, Sutton.

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R.C.V.S. OBITUARY

BROOME, John Dunbar, Capt. late R.A.V.C., Superintending Veterinary Inspector, Ministry of Agriculture and Fisheries (retired); Glendevon, The Grove, Rhyl, Flints. Graduated London, December 19th, 1908: Died January 17th, 1951; aged 64 years.

CASE, Arthur Pinson, M.R.C.V.S., 56, Cazenove Road, Stamford Hill, London, N.16. Graduated London, December 15th, 1891. Died January 17th, 1951; aged 83 years.

PERRYMAN, Walter, 22, Alexandra Road, Kingston Hill, Surrey. Graduated London, April 12th, 1888. Died January 19th, 1951; aged 82 years.

RICHARDSON, Arnold, Capt. late R.A.V.C., Trent Holme, Messingham, Scunthorpe, Lincs. Graduated Edinburgh, May 28th, 1889. Died January 15th, 1951; aged 85 years.

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Mr. Walter Perryman, M.R.C.V.S.

The passing of Mr. Walter Perryman, which we record above with deep regret and which took place at a Surbiton nursing home after an illness which began in November, will be felt with a great sense of personal loss by a very large number of metropolitan practitioners. Born in 1868, and educated at Salthill Grammar School, Bucks, he could claim, subsequent to his graduation at the London College in 1888, 50 years' practice in South London.

Mr. Perryman was held in high esteem, not only as an outstanding member of the "old school" of equine practitioners, but as a man who, though of retiring disposition, did everything in his power to promote the interests of his one great enthusiasm—the horse—and its owner. A great affection was felt for him by his fellow members of the Central Veterinary Society, of which he was a most faithful member throughout his professional life, and who almost automatically selected him as their well-informed representative on the Council of the National Horse Association. Our columns in past years bear witness to the helpful contributions the wealth of his knowledge and experience enabled him to make to the proceedings of the Society whenever equine matters, general or professional, were under discussion. He examined and purchased horses for the Army from 1914-18.

The supreme worth of Mr. Perryman's services to the Central Veterinary Society, unobtrusive as, characteristically, they were, was recognised by the Fellows on two occasions, namely, in his election to the Presidency in the 1890's and, after the first world war, in the conferment upon him of the "Victory" Medal.

Deep sympatny in their loss is extended to Mrs. Perryman and the two sons and two daughters who survive him.

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FUNERAL OF MR. RICHARD HUGHES, F.R.C.V.S.

In our last issue we paid tribute to Mr. Richard Hughes, F.R.C.V.S., of Oswestry, the first Honorary Life Member of the N.V.M.A., whose death, as we also recorded therein with the deepest regret, took place on January 10th, in his 95th year.

The funeral took place on Saturday, January 13th. The Revs. J. Price Williams, Christmas Jones and S. E. Morris officiated at the house and Oswald Road Church and Mr. Jones and Mr. Morris at the graveside.

In the course of a tribute to Mr. Hughes, Mr. Price Williams said Mr. Hughes' long life carried him back to the Victorian era; he was truly a Victorian in many ways. He took a tremendous interest in his calling and believed strongly in working hard. He raised the status of the profession to which he belonged.

Apart from his professional duties he was deeply interested in medical and scientific matters, and, Victorian though he was, he kept an open mind on all matters of research and believed in progressive thinking on those subjects. He thought very highly of his profession.

Mr. Hughes was noted for his hospitality. He kept his house open to ministers of religion and he was the perfect host, because he was such an interesting conversationalist. He was greatly interested in theological matters and was able to discuss them with clarity and discernment.

Over a considerable number of years he showed great loyalty to the church in Oswald Road. He also had an abiding interest in the welfare of the farming and landowning community. He faced all the problems of life philosophically. The passing of his only son, Mr. Hugh Tudor Hughes, in 1942, was no doubt a great blow to him as Mr. Tudor Hughes showed great promise as a veterinary surgeon. The manner in which Mr. Hughes bore that loss revealed that he was a man who had made his peace with events.

The mourners were Miss C. Hughes, Dolwen, Ferrers Road (sister), Miss J. K. Hughes, Brynoswallt, Queens Road (daughter), Dr. and Mrs. G. A. Edwards, 4, Queens Road (daughter and son-in-law), Mrs. H. Tudor Hughes, Freshfield, Morda Road (daughter-in-law), Mr. and Mrs. R. M. Edwards, Cranford (grandson and wife), Mr. and Mrs. M. H. Dummer, Aberystwyth (grand-daughter and husband). Miss Betty Edwards, London (grand-daughter), Alderman and Mrs. Henry Hughes, Rhewl, Mr. J. H. Wynne, Denbigh, Miss J. A. Wynne, Mrs. T. P. Roberts, Salop Road, Mr. Leonard Wynne, Wellington, Mr. and Mrs. Charles Jones, Tregeiriog, Mrs. John Lloyd, Cefnymaes, Mrs. Edwards, Tregeiriog, Dr. Kenrick Hughes, Hawarden, Mr. R. Parry Jones, Croeswylan, Mr. and Mrs. J. Parry Jones, Trefonen, Mrs. Hinckley, Croeswylan, Mr. S. Parry Jones, Mr. J. W. Davies, Glyn Ceiriog, Mr. Ted Hughes, Caemawr, Cynwyd, the Mayor (Councillor S. G. D. Campbell) and the Town Clerk (Mr. H. Bird Jones). The following bodies were represented: the Royal College of Veterinary Surgeons, by Mr. F. Aston, Condover; the Ministry of Agriculture and Fisheries, by Mr. H. C. Gregory; the National Veterinary Medical Association and the Ministry of Agriculture and Fisheries, by Mr. E. R. Corrigall; the West Midland and North Wales Divisions of the National Veterinary Medical Association, by Mr. George Wyse.

Those who sent wreaths included the Mayor, Aldermen and Burgesses of Oswestry; the President and Council of the Royal College of Veterinary Surgeons, and the President and Council of the National Veterinary Medical Association.

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SPREAD OF FOWL PEST

Fowl pest has spread from East Anglia and the Midland Counties to Shropshire, Cheshire, Lancashire and Yorkshire; also Worcestershire, Somerset and Middlesex.

Further outbreaks of the disease recently have been confirmed in Bedfordshire, Dorset, Lancashire, Leicestershire and East Anglia.

In a recent statement the N.F.U. emphasised that the only lasting solution to the problem of fowl pest "was to stop all imports of poultry from countries where it is known to exist."

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The Hereford Herd Book Society hope to arrange an international cattle conference during the Festival of Britain period to discuss matters affecting the breed throughout the world.

POULTRY STOCK IMPROVEMENT PLAN

The Minister of Agriculture and Fisheries, in consultation with his Poultry (Stock Improvement) Advisory Committee, has been considering the possibility of reopening the Accredited Section of the Poultry Stock Improvement Plan, which has been closed to new entrants for the past two years.

It has become clear that it will not be possible to provide from the available members of Poultry Advisory Staff for adequate supervision of an appreciably greater number of establishments than are already in the Plan. The Minister has accordingly decided with reluctance that it will be possible to admit as new members in 1951 only those breeders who will qualify for the Breeders' Grade. The manner in which applications for admission to this grade should be made will be announced in the spring.

At the same time the Minister has asked the Poultry (Stock Improvement) Advisory Committee to consider what amendments should be made in the conditions governing membership of the rest of the Accredited Sections of the Plan, so that by way of raising standards for existing members or otherwise it would become possible for new members to be admitted in 1952.

It has also been decided to defer the introduction of the Foundation Stock Breeders' (Progeny Tested) Grade and of the registered Certification Marks for use of members of the Poultry Stock Improvement Plan.

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FOOT-AND-MOUTH DISEASE

On Monday last foot-and-mouth disease was confirmed among cattle and pigs at Northfield, Birmingham and Middleton, Warwickshire; also among cattle and sheep at Burley-in-Wharfedale, Yorkshire (West Riding).

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

SWINE FEVER:

Derbys.—Park Road Allotments, Shirebrook (Jan. 17th).

Renfrewshire.—Hawkhead Piggery, Hawkhead Road, Paisley (Jan. 16th).

Suffolk (E.).—Arch Cottage, Wherstead Road, Ipswich, Suffolk (Jan. 15th).

Yorks (W.R.).—3, Fifth Avenue, Woodlands East (I.P., 49, Grange Allotments, Highfields, Doncaster) (Jan. 16th).

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There were nine cases of anthrax in Herefordshire during 1950, all of them among cattle on hop farms. The divisional veterinary officer, Dr. A. J. Wilsdon, has stated that in each case the origin appeared to be in the use of imported raw bone fertiliser for hops.

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"Betwixt now and the first of February next there is a good ship to sail from Aberdeen to Antigua. These are therefore to certify all good Tradesmen, those that can write and keep accompts, men skilled in Distempers of black cattle and horses and other servants from 12 years old and upwards. That upon Application to John Elphinston or Andrew Garioch, Merchants in Aberdeen, they will be indented for four years only, find greater encouragement than ever given from this Place and will be strongly recommended by the said Andrew Garioch, who left that island not 15 months ago."—"Two Hundred Years Ago" (dated November 15th, 1748) feature of *The Aberdeen Journal* of November 20th, 1950.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

EQUINE CASTRATION

Sir,—I read with great interest Professor Formston's article on the castration of young foals.

He is correct in stating that the practice of castration at such an early age is not new. Many mediaeval palfreys were castrated within a few weeks of birth with the intention of keeping them docile and of effeminate appearance and action. Various attempts have been made to revive the practice and perhaps that of Galvayne (of Galvayne's Groove fame) was the most notable during the last century.

Like Professor Formston, my experience of castration at this age has been limited to a comparatively small number of pony foals, but, unlike him, I have had the opportunity of observing the results of my handiwork month by month throughout the whole lifetime of the victims, and of comparing their appearance and working capacity with a large number of others kept under identical conditions. These foals were bred in the same stud expressly for pit work and were all sired by the same stallion. During the General Strike of 1926 it was decided to evacuate the breeding mares and young-stock to a farm in another county in order to reserve the available grazing for ponies withdrawn from the pits. All males were to be castrated before they were sent away. Of 37 young foals 18 were males and averaged one month in age; of these, only seven, *i.e.*, just under 40 per cent., had palpable testicles, and these were castrated. They were very small as neither the sire nor dams measured 12 hands in height. Each foal was lifted and laid near-side down on a bale of straw. One man held both forelimbs in flexion and the head, while another held the off-hind limb forward with the hock flexed; the near hind limb was not controlled. The scrotal area was washed with soap and water and dried with spirit. The testicles were exposed and the non-vascular part of the spermatic cord was severed as high as possible with the knife; the vascular portion was twisted into a thin rope and scraped through over the thumb nail. No instrument other than the knife was used and the scrotal wounds were left open. No anaesthetic was given and the time taken per foal was about one minute. There were no untoward sequelae and after-treatment was unnecessary.

The operation was as simple and straightforward as in the young calf or pig and the foals took as little notice of it.

During the following season (1927) six foals were castrated similarly; these again represented about 40 per cent. with descended testicles. Of the remaining 60 per cent., neither then nor now could they be considered abnormal or cryptorchid. When examined as yearlings every colt had properly descended testicles in the scrotum.

As yearlings there was no appreciable difference in appearance between the early castrates and their entire brothers. At two years the difference was apparent and the castrates were as easily picked out from the mixed herd of colts and fillies as are capons from a flock of barnyard poultry. When this difference in development was discerned the practice of early castration was discontinued. At four years old they were sent into the pits together with their brothers of the same age and went steadily and quietly to work without vice or temperament. They appeared to be taller, lighter in weight, and longer legged than the others, but the measuring standard and weighing machine proved that these differences were more apparent than real. Where they really differed from entires, mares, and those gelded later, was in the distribution of the superficial fat, and this became more obvious as they aged. The penis remained small and undeveloped and was seldom drawn during micturition; this entailed extra cleaning for the horse-keepers. They never found full favour with the drivers, who, although knowing nothing of their early history, gave them a most appropriate if somewhat rude nickname, from their more mincing gait and lack of stamina. I most certainly believed then, and still believe, that by operating too early I spoiled both the appearance and working capacity of 13 of the best bred pit ponies in the country.

My experience of equine castration forces me to the conclusion that the best age for operation is entirely dependent upon the future occupation of the animal. Doubtless there is some justification for Professor Formston's attempt to revive this ancient practice, when, in these days of mechanisation, good horsemanship is rapidly becoming a lost art, and, except on the race-course or hunting field, a mettled horse is more likely to form part of the human diet earlier than his sluggard brother. I would however advise the younger generation of veterinary surgeons that should horses ever again be required for heavy work or endurance they ought never to be castrated until they show definite signs of masculinity, which in the heavier breeds particularly, will seldom be under one year old.

Yours faithfully,

A. A. FORSYTH.

7, Kirklee Circus,
Glasgow, W.2.

January, 15th, 1951.

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STORAGE OF BULL SPERMATOZOA AT LOW TEMPERATURES

Sir,—Smith and Polge (1950) reported on the survival of bull spermatozoa at a temperature of −79° C., which was in marked con-

trast to the normally considered optimum temperature of 5° C. for the storage of semen.

Following the technique of Smith and Polge, experiments were commenced at Reading to ascertain if fertility was maintained at −79° C. The percentage of spermatozoa remaining motile after the temperature had been reduced to that level and restored to 37° C. was apparently much lower than that described by the original workers. Five cows were inseminated with semen stored at −79° C. for various periods; one of these proved to be pregnant and subsequently delivered a normal live bull calf. As this cow was being used in a metabolism experimental unit it is certain that it could not have been served at any other time.

For this insemination the diluted semen, which had been stored at −79° C. for 46 hours, contained a final concentration of 16 per cent. of glycerol, one part of the semen having been diluted with four parts of citrate-egg-yolk-glycerol mixture as under:—

3·6 per cent. Sodium Citrate solution ...	6 parts
Glycerol	4 parts
Egg Yolk	10 parts
Semen	5 parts

If spermatozoa can remain fertile at −79° C. at all, it is reasonable to believe that at such low temperatures fertility might be maintained for very long periods, in which case the advantages to be derived from the application of this technique to specialised breeding and breeding experiments would be obvious.

Yours faithfully,

Reading Cattle Breeding Centre, Shinfield, Reading, Berks
D. L. Stewart.

January 16th, 1951.

References

Smith, A. U., & Polge, C. (1950.) *Vet. Rec.* **62.** 115-116.

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INCIDENCE OF SALMONELLAE IN FAECES OF DOGS SUFFERING FROM DISTEMPER

Sir,—I was interested in the contribution which appeared under the above heading in the *Record* of December 2nd, 1950, in which Smith and Buxton support the suggestion of Kintner[1] that the higher incidence of Salmonella in dogs in the United States is related to diet.

The incidence of Salmonella is undoubtedly related in part to diet, particularly if the food contains rejected eggs, but the incidence in the United States and Great Britain can hardly be compared on the basis of a few isolated investigations.

Variations in diet occur in different areas and at different seasons of the year. Recently Galton[2] reported an over-all average of 30 per cent. of Salmonella from 3,600 anal swabs from dogs in Florida.

At the small-animal clinic in Auburn during an investigation of the occurrence of *Proteus* sp. in various species of animals, anal swabs from 100 dogs were examined. Organisms which were not Proteus and still non-lactose fermentors were typed at the Salmonella typing laboratory of the University of Kentucky. *S. schottmulleri* (animal strain) was the only member of this genus to be identified. *Ps. æruginosa* was identified in one case. A small number were of the paracolon group, but the identification was not completed. One of these was biochemically but not antigenically similar to the Arizona paracolon group. Incidentally, organisms of this latter group have been reported as causing considerable losses recently in chickens in the South-eastern States.

Yours faithfully,

Frank H. Manley,
Professor, Department of Bacteriology.

School of Veterinary Medicine,
Auburn,
Alabama.

January 4th, 1951.

References

[1] Kintner, L. (1949.) *Vet. Med.* **44.** 396.
[2] Galton. Florida State Board of Health. Personal correspondence.

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ELECTROCUTION OF UNWANTED DOGS AND CATS

Sir,—Mr. Harvey Johns says : t if what I fear is true, the Canine Defence League is responsible "for the excruciating torture of hundreds of dogs every day." I shall be a little surprised if that finding should be the result of our investigation. I should *not* be surprised, however, if it should be found that a small percentage of the dogs suffer unduly. Mr. Johns may remember that some 25 years ago one of these cabinets, though with a considerably lower voltage-rating than that now adopted, was in use in Islington, and some of us agitated for an investigation of its humaneness. We encountered obscurantist obstruction for more than a year, but eventually an eminent physiologist was called in; a temporary vivisection licence was obtained for the premises; a test similar to that now suggested by Mr. Johns was applied; and as a result of the physiologist's report the cabinet ceased to be used. There can be no doubt that in that case the "excruciating torture" Mr. Johns speaks of was inflicted on a large number of animals. We now wish to find out in what percentage of cases, if any, substantial suffering is inflicted. I shall be surprised if it is not small and surprised also if it is zero.

I see no fundamental objection to the test Mr. Johns proposes (*viz.*, clinical examination of dogs after a three-second shock) subject to the following three considerations. (1) He must, of course, obtain a vivisection licence for his premises in order to comply with the law. (2) He invites me to "bring any number of dogs I like" to his clinic for the test. I know of no way in which I can obtain these dogs, since the purchase of the large number required would be beyond the means of such an impecunious society as UFAW. As he has hundreds of dogs a day at his disposal his invitation appears to be unreasonable in this respect. (3) The electrocution must not be considered satisfactory unless persistent ventricular fibrillation is set up in each case.

The method we propose to adopt has the practical advantages that (1) it can be carried out on any number of animals without disturbing the normal course of the electrocutions—and incidentally it would consequently avoid the bother of having to obtain a vivisection licence, whereas Mr. Johns's method necessitates an experimental variation of the conditions and therefore would involve a breach of the law if carried out without a vivisection licence. (2) A smaller sample would probably suffice, because we should be measuring a continuous variate instead of the quantal response favoured by Mr. Johns. (3) For the same reason our method would probably be more informative.

On the other hand, there is this to be said in favour of applying Mr. Johns's test to a really large number of dogs if genuine facilities can be afforded. Kouwvenhoven, Hooker and Lotz, using a different technique, found that "an occasional heart was resistant and required either an unduly large increase in current or a prolonged application of the shock to produce permanent ventricular fibrillation (*Electrical Engineering.* **55.** 384. 1936). Was Ferris's sample of ten dogs large enough to take account of these exceptionally resistant hearts? Not, certainly, unless they correspond to extreme values of a continuous variate; perhaps not in any case. This is one of the points that can be cleared up if people will love dogs sincerely enough to drop the obstruction and obscurantism with which we have so long been faced.

The question arises—what ought to be done by users who are at present electrocuting large numbers of these animals and have no satisfactory alternative available? I suggest that to take the risk of inflicting brief though severe pain on a small percentage of dogs may well be the lesser of two evils in such cases, pending the completion of the contemplated investigation.

Yours faithfully,

C. W. Hume.

The Universities Federation for Animal Welfare,
284, Regent's Park Road,
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January 11th, 1951.

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THAT VULGARISM "VET"

Sir,—In the late autumn of last year I noticed advertisements in our professional journals by a firm of dog food manufacturers, stating "Leading 'Vets' recommend." I wrote to this firm drawing their attention to the fact that we, as members of a learned profession, took umbrage at the abbreviation "Vet" and that by Royal Charter our proper title was Veterinary Surgeon. In due course I received a very courteous reply coupled with an apology and the objectionable term was deleted.

More recently, however, I noticed the same advertisement in a London daily, and again I wrote to this firm expressing my surprise in view of the contents of their letter. To this I had no reply, but what is more important, I noticed in a later issue of the same paper, "Leading authorities recommend."

And so one more incident is closed.

Yours faithfully,

Frvern Hall, Bridgwater.
Wm. Scott.

[So far as *The Veterinary Record* is concerned, we too took effective action in this matter.—*Editor.*]